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**To cite this article:** Predrag Bejaković (2015) A revision of the shadow economy in Croatia: causes and effects, *Economic Research-Ekonomska Istraživanja*, 28:1, 422-440, DOI: [10.1080/1331677X.2015.1059104](https://doi.org/10.1080/1331677X.2015.1059104)

**To link to this article:** <http://dx.doi.org/10.1080/1331677X.2015.1059104>



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Published online: 30 Jun 2015.



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## A revision of the shadow economy in Croatia: causes and effects

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*(Received 2 June 2014; accepted 2 March 2015)*

The shadow economy encompasses all areas of economic activity, which are officially considered inconsistent in comparison to the ideological prevalent form of economic organisation. The definition of ‘shadow’ or ‘underground’ economy is not firmly fixed but subject to change and varying criteria. There is a whole range of measuring methods adopted according to various principles. The text shows the connection between the shadow economy and economic policy, what stimulates growth of the shadow economy and what measures can be taken to influence the way it develops. After a short introduction, definition and measuring are explained. Section 3 is dedicated to the situation in Croatia, where various methods are explained followed by section 4 which explains the links between the shadow economy and economic crisis. The article finishes with conclusions and recommendations for improvement.

**Keywords:** ‘shadow’ or ‘underground’ economy; tax evasion; economic development; Croatia; tax culture

**JEL classification:** E6, H2, I3

### 1. Introduction

The shadow economy includes economic activities which are considered inconsistent in comparison to the ideological prevalent form of economic organisation. The informal economy encompasses all activities that are formally legal but ideologically suspect; hence there is an official tendency to discriminate amongst them and give them an inferior status. Activities in the ‘hidden’ economy consist of undeclared legal production of goods and services, production of illegal goods and services, and concealed income in kind. The first is the largest component of the shadow economy and covers productive activities that are quite legal in themselves but which are concealed from public authorities to avoid taxes and similar charges.

The definition of the ‘shadow’ or ‘underground’ economy, as is the case with so many economic phenomena, is not firmly fixed but subject to change and varying criteria. Thus there is the legal one (illegal economy), the moral one (its illegal nature and the fact that it contravenes the accepted rules of business), the institutional one (income realised through this kind of operation is not included in routine record-keeping and statistics), the quantitative one (those economic activities which could be measured in some way but have so far never been analysed), and finally, the ideological one, which depends, to a great extent, on the prevalent economic system in society and corresponding economic policy.

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The informal economy is present in all societies irrespective of their dominant social and political system. Nevertheless, there are considerable differences in the scope and form that the informal economy may assume in each society. There are as many non-compliant activities as there are rules to be violated. It has been shown that underground economies comprise similar types of noncompliant behaviours. For example, when fiscal rules are violated, tax evasion and benefit fraud behaviours are said to comprise the *unreported economy*. As suggested earlier, rule violators, mindful of penalties, will typically seek to conceal their behaviour from public authorities. When income-producing activities are concealed and thus cannot be appropriately included in national income accounts, accounting conventions are violated, creating an *unrecorded economy*. Those activities involving the abuse of public office for private gain constitute the *corruption economy*. More generally, those activities that violate the rules prohibiting extortion, financial fraud, smuggling, organised crime, and theft of state property are examples of *illegal economy* activities.

Although in the majority of developed countries the volume of the informal economy is not considered large compared to the total gross national product, neglecting this phenomenon leads to a significant disproportion in certain items of national accounts, misinterpretation of official statistic's records, and consequently national economic policy. Hence, in the majority of countries estimates concerning the growth of the informal economy are probably more important than estimates of its volume.

The motivation of research is to show the connection between the shadow economy and economic policy, what stimulates growth of the shadow economy and what measures can be taken to influence the way it develops. This paper deals with the estimation of the shadow economy in Croatia and its size over the observed period. The aim of the article is to provide trends, causes and possible remedies for the shadow economy. While the share of unreported labour is decreasing in upward phases of economic cycles, the share of inaccurate reporting (under-reporting of income by firms and individuals) is increasing. On the other hand, in the recession period, there is evidence of a rising impact of unreported labour. The article points to the main factors behind unofficial economy growth during recessions.

After this short introduction, definitions and measurement issues are explained. Section 3 is dedicated to the situation in Croatia, followed by section 4 which explains the links between the shadow economy and institutions and economic performance. The text finishes with conclusions and recommendations for improvement.

## 2. Definition and measuring

As mentioned, there is a whole range of definitions adopted according to various principles. One of the broader definitions accepted by Feige (1990) considers all economic entities as part of the official economy, providing their actions are performed according to the established institutionalised 'rules of the game'. Only economic entities which do not operate according to institutionalised rules in the market can be considered a part of the unofficial (or 'grey') economy. The trend of the institutionalised economy (North, 1989), which studies relationship between economic development and economic institutions, reveals the fact that institutions (which provide the basis for establishing the rules of behaviour for economies entities) define the development and structural composition of the official and unofficial economy in a given country. The correlation between the *economy* and *institutions* is defined through the level of transaction costs associated with any kind of economic exchange. The differences associated with the function of the

official and unofficial economy in fact determine their significance in the process of economic development. In most cases, however, distinction between the official and unofficial economy is not that simple. The two are interconnected and interlaced even in highly developed market economies with a precise and clear institutional framework and transparent written and non-written customs of conduct for economic entities in the market. This interdependency is even more complex and pronounced in countries in transition where an institutionalised framework has yet to be built. Probably the most useful is the definition of total economic activity as a sum of an observed and imputed unobserved component provided by Feige and Urban (2008):

$$Y = Y^R + Y^{UR} = Y^{RO} + Y^{IUI} + Y^{UR}$$

Where  $Y$  = total economic activity (TEA)

$Y^R$  = recorded economic activity (measured output; GDP),

$Y^{RO}$  = recorded observed economic activity,

$Y^{IUI}$  = recorded unobserved economic activity,

$Y^{UR}$  = unrecorded activity.

They defined the unobserved economy ( $Y^U$ ) as the sum of unrecorded and recorded unobserved income:  $Y^U = Y^{UR} + Y^{IUI}$

The scope of the shadow economy is usually estimated by: (1) a monetary approach or Tanzi method where underground transactions are conducted only on a cash basis; (2) official statistics with arbitrary estimates; (3) calculation and analysis of the structure of the informal economy (the share of the informal economy in gross national product cannot give an idea of the structure of goods it produces and services it renders. In order to gain a better insight into the causes of this phenomenon it is important to observe where the informal economy is more prominent and where its share is small or negligible; (4) labour input methods based on comparing the rates of activity in longer period or among different countries (if rates of activity are decreasing, it can be due to withdrawing from formal to informal sector); (5) discrepancy method using differences between income and consumption (if consumption is bigger than income – on the level of national economy or on micro level of particular household – this part of income can be realised in informal economy); (6) using the data from national accounts; (7) better control of taxpayers and tax obligations; (8) examining the opinions of experts for a particular part of the economy; (9) latent variable methods or methods of causes where the reasons that stimulate for the participation in the shadow economy are analysed: search for determinants (e.g. real and perceived tax burden, the burden of regulation, tax immorality, etc.) and indicators (male participation rate, hours worked and growth of real GNP). Then, calculate undeclared work with the aid of econometric tools such as MIMIC or DYMIMIC; (10) global indicators methods electricity consumption where the difference between the growth rate of electric consumption (a proxy for the growth rate of TEA) and the growth rate of measured GDP yields an approximation of the growth rate of unrecorded income; (11) methodology for estimate of non-exhaustiveness of national accounts in Croatia based on the Eurostat approach – the classification of non-exhaustiveness types in the national accounts is based on various characteristics of the producer, i.e. the way in which data is obtained from producers. The classification of non-exhaustiveness types in the national accounts is presented in Table 1. Regardless

Table 1. Status of employment of people working in the unofficial economy, 1995.

%	Total	Additional job	Housewives, students	Unpaid family workers	Own-account activities
Owners of companies, crafts enterprises and similar professions	21.33	14.14	65.52	0.00	0.00
Workers employed in state-owned or mixed sector	17.54	67.68	6.03	0.00	0.00
Workers employed in the private sector	11.14	14.14	28.45	0.00	0.00
Unpaid family workers	40.76	3.03	0.00	100.00	0.00
Own-account workers	9.24	1.01	0.00	0.00	100.00
Total	100	100	100	100	100

Source: Crnkovic-Pozaić (1997).

of the mutual exclusivity of individual forms, in practice there can also be cases in which individual types of non-exhaustiveness in the national accounts overlap.

This is not a mandatory classification; rather, freedom is allowed for the countries taking part in the project to adapt it in line with their own economic conditions and legislation. It is also possible to use other lines of division between the recorded (declared) economies in various countries. Taking practicality into consideration, it is much more important to cover all the forms in which it shows up than to solve the classificatory problem completely.

In the majority of countries estimates concerning the growth of the shadow economy are probably more important than estimates of its volume (Ott, 2002). The shadow economy may (and indeed does) play an important positive role as a stimulus for social development, primary as an important economic cushion, free from control and taxation, that alleviates the social consequences of transition period, struggle against inflation and economic restructuring. These consequences would be more severe without the shadow economy. The unofficial economy influences the successful implementation of the economic policy (Feige, 1979). The greater the shadow economy, the greater its influence on economic policy. Research has shown that this economy has reached significant proportions in many countries (Schneider, 2005; Tanzi, 1983).

### 3. Results for Croatia

#### 3.1. Various approaches to the measurement

The Institute of Public Finance (Ott, 2002) in the Project *The Underground Economy in Croatia* have applied various approaches to the measurement of The Underground Economy (UE): via the national accounts, monetary methods, LFSs, tax evasion. They have attempted to evaluate the UE in individual industries, e.g. in agriculture, industry and trade, tourism, foreign trade. In the text are also used results and data from Lovrinčević, Mikulić, and Galić Nagyszombat (2011), particularly related to the role of the unofficial economy during the time of the economic crisis.

### 3.2. *Discrepancy methods*

Since 1990 Croatia has been marked by considerable changes in the statistical system (research methods, and the actual concept), discontinuity in different statistical research, high inflation in the early years, the creation of numerous new units with low statistical discipline, and the disappearance of large business systems. Despite major efforts to improve the quality and exhaustiveness of national accounting systems, it is widely recognised that current statistical practice still fails to incorporate a wide range of undeclared work. As we await the much-anticipated improvement in the exhaustiveness of national accounts, it becomes all the more important to pursue macro-economic modelling estimates of the dynamic evolution of the unobserved economies and undeclared work as an independent check on the veracity of new Statistical national accounts (SNA) measures of undeclared work (UW). The estimation of undeclared work using the discrepancy method in SNA gives significantly lower levels in comparison with the estimation by monetary methods (Lovrinčević, Marić et al., 2006). They believe that a reason for the mentioned differences might be that the discrepancy method evaluates the differences between two independent approaches to the assumption of Gross Domestic Product while a significant part of UW is left uncovered. United Nation (2003) using Imputed Unobserved (NOE) Income  $Y^{IU}/(GDP) * 100$ , estimated that in Croatia the share of UW was 8.9% in 1998 and 8.1% in 1999.

### 3.3. *Labour input methods*

The estimation of employment in the unofficial economy realised by the Labour Force Survey (LFS) is a good information source on employment in the unofficial economy due to the fact that the measurement unit is a household and shadow economy encompasses all areas of economic activity, which are officially considered the individuals within it. The target categories selected for the survey are: persons having an additional activity besides their main job; unpaid family workers on the family estate, craft enterprise, independent profession or company; persons engaged in various activities in order to earn their means of sustenance.<sup>1</sup> The common name for this category is own-account workers. Their activity is characterised by the fact that it ceases when they stop performing it and that their production equipment is very limited; persons whose prevailing status is different from the status they presently have, mainly including housewives, students, pupils, retired persons and persons who do not usually work and persons who cannot be classified into any of the above mentioned categories. The first estimation method used in this study did not allow an estimate of the first of the aforementioned categories which is of primary interest here. Some insight was shed on the rest of the categories by the population census, which also numbered unpaid family workers and own-account workers. All the categories surveyed worked at least one hour during the reference week (November 1995) or were absent from work to which they could return. Crnković-Pozaić (1997) calculated frequencies in the unofficial economy according to occupation at the highest aggregate level. According to this source, the level of the unofficial economy is 25.79% of total employment. Among the categories, 6.23% of the population surveyed is engaged in additional business activities, 10.23% are unpaid family workers, 2.3% are own-account workers and 7.02% are housewives, students, retired persons and usually unemployed persons. The employment composition of undeclared work reads as follows: 39.7% are unpaid family workers, 27.2% are prevalingly inactive groups, 24.2% are persons engaged in additional business activities and 8.9% are own-account workers.

Lovrinčević, Mikulić, and Niksić-Paulić (2002) stress that the main method for the establishment of undeclared work derives from a failure to register subjects (in this case, employment). In their survey they used the results of an analysis of data about employment from the Household Labour Force Survey (LFS) and data about employment from the annual statistical reports that serve as a basis for the calculation of GDP. The number of employees per industry from the LFS was compared with the number of employees from the annual reports that are used for a calculation of GDP, as well as with the data on the base of hours of work, or on the basis of full time work. The difference was assumed to indicate unregistered or unreported employees. Since the results of the survey are reliable only at the level of area of industry (letter level), comparison was possible only at that level. However, in order to obtain an estimate about unregistered employment at the level of National Classification of Economic Activities (NCEA) tabulation category, in each area we divided the difference in terms of tabulation categories according to the number of employed persons in small units (small firms, owners of trades and their employees). In this way it was assumed that those sections in which there were more small units covered proportionately more unregistered employees. The value of gross product, intermediate consumption and added value per employee made by small entrepreneurs in the same branch with two to nine employees was associated with the unregistered employees. By this method, the estimated grey economy deriving from undeclared work is estimated. The gross added value created with this kind of work came to HRK 7.4 billion in 1999 or HRK 8.3 billion in 1998, from which it would appear that it is this form of undeclared work prevails in the Republic of Croatia.

### 3.4. Degree of participation method

Table 1 offers another insight into employment of undeclared work for the year 1995 (the only available survey of this type by Crnković-Pozaić, 1997). It deals with the status of employment, in other words, whether a person is self-employed, an employee or an unpaid family worker. Self-employed persons have been represented as owners or co-owners of companies, crafts and trades, independent professionals and freelancers on one hand and as own-account workers on the other. Employees are distinguished by the ownership sector in which they are employed, and unpaid family workers stand by themselves. Crnković-Pozaić (1997) analyses cross-referenced status in informal employment with the individuals' activity status.

Among persons undertaking undeclared work activities, the most numerous are unpaid family workers (40.76%). This group is followed by the category of owners or co-owners of companies and independent professions or agricultural estates with 21.3%. Employees working predominantly in the state-owned or mixed ownership sector make up 17.54% and 11.14% are engaged in additional activities in the private sector. The remaining 9.24% are own-account workers.

### 3.5. Tanzi method

To measure the unofficial economy by a monetaristic approach it is necessary to: (1) measure the nominal GDP, which has not yet been done in the majority of countries; (2) pay more attention to foreign currency and include it in future research on analytical currency supply in the unofficial economy; (3) research and monitoring the connection between seasonal trends and the unofficial economy in certain economic activities (such as, for example, tourism); and (4) monitor all data series required for the monetaristic



assessment of the unofficial economy, which would make it possible to use this long term method in calculating the size of the unofficial economy, a procedure which is not yet feasible in Croatia.

In transition countries, currency substitution (the substitution of foreign currency for domestic currency as a medium of exchange) results in unofficial or *de facto dollarisation* (Feige, 2003). Since foreign currency is widely thought to be used for undertaking unrecorded transactions and undeclared work, we must await monetary estimates of unrecorded income that include estimates foreign currencies in circulation in these countries (Feige, 2002). In the literature, two monetary methods of estimating UE dynamics are familiar. The first approach (sometimes called the Cagan method) is founded on the link between demand for money and the level of tax pressure (Jankov, 1997; Schneider & Ernste, 2000). Cagan's method has been improved by Tanzi, who estimated the function of the demand for cash as a medium that is principally used in undeclared work. Tanzi used different conventional determinations of the demand for money, such as income, interest rates and the development of habits of payment as control variables. He has also included both direct and indirect tax rates and the level of national regulations and the complexity of the tax system into the equation, which he assumed to be the main factors that led to working on an undeclared basis.

Gutmann's approach is the second derivation of the Cagan method, although it is sometimes held to be a method of its own. There are no real reasons for this, because the two approaches are fundamentally based on the same idea (Schneider & Ernste, 2000). The Guttman approach is a simplification of Cagan's, in which statistical procedures and the effects of other factors are taken out, and changes in the proportion of cash in the overall money supply are ascribed only to the dynamics of undeclared work.

Both these methods have certain weaknesses. For example, there is no reason to believe that the velocity of money in payment for declared and undeclared work is the same, especially since there are different forms of payment (cash and deposits). The ratio of cash to deposits may be increased because companies learn to optimise the amount of money in their accounts, in which they are assisted by financial innovations, not because of the rise in undeclared work. There is no proof that it is only cash that is used in the undeclared work sphere, while the use of deposited money is limited to declared work. If deposit money is really used for undeclared work, the real level of undeclared work could be even higher than estimated. Some of these problems are addressed in the second variant of the monetary approach, the transaction or Feige approach. The main assumption of this is the assumption of the existence of a constant link between the volume of transactions in the economy (cash or non-cash) and the size of GDP (created in both declared and undeclared work). However, shifting the problem of measuring the undeclared to measuring the volume of overall transactions does not actually settle it. Measuring the total volume of transactions is also not very simple, particularly for the cash part of transactions.

Sosic and Faulend (2002) stress that in Croatia there are a number of practical problems. The monetary approach is based on a long series of monetary data from which it is possible to derive money demand function and other conclusions about reactions of habits of keeping local cash with respect to changes in the legislative and tax environment. But in Croatia, because of the various shocks that have occurred in the still short post-stabilisation period, like the repatriation of deposits from abroad and the banking crisis of the end of the 1990s, it is very difficult to expect a reliable correspondence between monetary variables and variables approximating the level of the regulatory and fiscal burden. Considering the instability of the money demand function in Croatia,



which is evident from the different parameters, estimated when the estimate is carried over different periods of time, statistical properties of the monetary variables do not allow us to use them in estimates of undeclared work dynamics. Sosic and Faulend (2002) nevertheless opted for the transaction approach, but were faced with new problems – the reliability of the size of total transactions. The problem is particularly large for cash transactions. Of course, there are indicators of the average life of Croatian banknotes, depending on the denominations. However, so far there has been no research attempting to estimate the average number of transactions that is carried out with these notes, which makes an estimate of the amount of cash transactions practically impossible. It is due to such problems that Sosic and Faulend (2002) decided to avoid statistical procedures and test out the simple Gutmann approach using Croatian data. Mentioned results are primarily of an indicative nature.

The assumptions from which they started are standard for the Gutmann model. They have assumed that deposit money (i.e. the non-cash component of M1) is used only in declared work, while cash is used both for declared and undeclared work. Additionally, cash used for declared work is a linear function of deposit money. A further assumption relates to the level of undeclared work in the period that they have chosen as the starting period. As the starting level for undeclared work they decided to take 25% of GDP as recorded in the official economy, which is found to be an average for the period from 1990 to 1995 by the previous study (Ott, 1997). Various estimates for the last year in this period oscillate around this level, but the average does not deviate very much (Table 2).

Although the indicators show a large degree of variability, the method indicates a rising trend in undeclared work during the five years for which they carried out the analysis. The absolute level of undeclared work in each year can be increased or decreased by changing the assumption about its initial level. The results are of course subject to all the usual criticisms about the use of monetary methods, criticisms that with respect to Croatia are more than usually important. In the continuation Sosic and Faulend (2002) devoted more attention to criticisms of monetary methods due to the widespread dollarisation and they attempted to use the problem of dollarisation constructively for a different approach to evaluating dynamics of undeclared work. Monetary methods for estimating the undeclared work UE were developed and their use started in advanced countries that are not even remotely subject to the problems of dollarisation to the extent that exists in many countries with a lower level of per capita GDP. However, OECD countries encounter problems of a different kind. Large quantities of their cash circulate abroad, and changes in international cash flows can have a considerable effect on the success of monetary methods of estimating the UE in these countries. Because of all the evidence indicating the importance of the amount of foreign cash in circulation for undeclared work in dollarised countries, it might be expected that researchers would have put it at the focus of their UE research. Nevertheless, as far

Table 2. Estimates of the size of the UW for Croatia based on the Gutmann method, with the employment of domestic monetary aggregates.

	1995	1996	1997	1998	1999	2000
C/M <sub>1</sub>	0.38	0.38	0.40	0.40	0.42	0.38
GDP <sub>UW</sub>	25.0%	24.7%	29.2%	29.8%	34.0%	25.3%

Source: Sosic and Faulend (2002).

as it is generally known, monetary estimates of the UE in dollarised countries are still based on local currency data, and awareness of the problems with monetary methods of measuring undeclared work that are created by dollarisation is often pushed to the side.

In their endeavour to estimate Croatian dynamics of undeclared work, Sosic and Faulend (2002) used simple assumptions because they are of the opinion that the very attempt of an estimate based on foreign cash in circulation is a move in the right direction. Firstly, they assumed that only local currency was used in declared work, while only foreign currency is used in undeclared work in the form of cash. Further, they supposed that changes in the ratio of the two components of the GDP, that is the GDP created in declared work and that generated in undeclared work are in proportion to changes of the ratios of the estimated amount of foreign cash in circulation and the domestic monetary aggregate M1, as is shown in this identity:

$$(FCC_t/M1_t)/(FCC_t - 1/M1_t - 1) \equiv (GDP_{UW_t}/GDP_{DW_t}) / (GDP_{UW_t} - 1/GDP_{DW_t} - 1)$$

FCC = foreign currency in circulation; M1 = domestic monetary aggregate; GDP = gross domestic product; UW = undeclared work; DW = declared work

From this assumption it can be derived that the postulation that changes in the income velocity of the circulation of the domestic monetary aggregate M1 and foreign cash are proportional. Of course, foreign cash must be used in many transactions such as the purchase of used residences and cars that could not be considered generators of undeclared work. In such transactions, most of the taxes to the state are paid, but since the transactional medium is foreign cash, these transactions do, in a certain way, belong in the informal sphere. Since they do not contribute to GDP, they do not affect the income velocity of circulation of foreign cash, and they will not be considered here. The last of these assumptions is the initial level of undeclared work. In the previous estimate they started off from the level of 25%, which is what they kept in this one. Table 3 gives results of an estimate based on estimations of foreign cash in circulation.

While the share of foreign currency in circulation in domestic monetary aggregate M1 oscillated around 0.30, the share of undeclared work in GDP was around 25%.

### 3.6. Global indicators methods: electricity consumption

To date, data limitations have confined the use of macro-economic modelling estimates of unobserved activities in transition countries to those based on variants of the electric consumption methodology (ECM) most prominently, Kaufmann and Kaliberda (1996); Johnson, Kaufmann, and Shleifer (1997); Eilat and Zinnes (2002).

*The Kaufmann–Kaliberda method.* Although the physical input approach has already been used in underground economy estimates, the application of this method was developed relatively recently. In order to measure the TEA of a national economy, Kaufmann

Table 3. Estimates of the size of the UW for Croatia based on estimations of foreign currency in circulation.

	1995	1996	1997	1998	1999	2000
FCC / M <sub>1</sub>	0.29	0.26	0.30	0.30	0.32	0.30
GDP <sub>UW</sub>	25.0%	22.0%	26.1%	25.5%	24.9%	25.8%

Source: Sosic and Faulend (2002).

and Kaliberda (1996) assume that electricity consumption is the best physical indicator. Total (official) economic activity data as well as electricity consumption data are available for the majority of the economies. The authors also assume that the electricity consumption is a good indicator of the total GDP trend as short-term elasticity is equal to one. Therefore, they designate the difference between electricity consumption growth rate and the official GDP growth rate as an instance of the underground economy. The criticism of this method includes that electricity is not a significant input in certain underground activities (namely personal and business services), and alternative energy sources can also be used (such as coal, oil, etc.) and therefore this method only partially measures the true size of the underground economy. Furthermore, energy production and consumption are far more efficient today. Finally, there are significant differences and variations in the elasticity ratios between GDP and electricity consumption, both dynamically and across different countries.

*The Lacko method.* Lacko (1998) assumes that a certain amount of underground economic activity is connected with household electricity consumption. Based on a cross-country analysis, an econometric regression is estimated. The dependant variable is the per capita household electricity consumption, and the independent variables are the following: average real per capita expenditure, electricity price in US dollars, number of heating months, the proportion of the other energy sources consumption and per capita underground economy output. This last variable is calculated in another regression as a function of personal income tax ratio, company profits and overall tax burden on goods and services, as well as the ratio of public expenditure in the GDP and the share of dependant population in total population. The difference between observed and expected consumption is assigned to electricity consumption in the underground economy.

Feige and Urban (2003) attempted to replicate and update earlier estimates (Dobozi & Pohl, 1995; Johnson, Kaufmann, & Zoido-Lobaton, 1998; Johnson et al., 1997; Kaufmann & Kaliberda, 1996) of unrecorded income based on simple ECM and examined the sensitivity of the results to alternative specifying assumptions. They found that simple ECM estimates were highly sensitive to alternative initial conditions (Alexeev & Pyle, 2003) concerning the pre-transition size of the unrecorded sector and produced seemingly anomalous negative shares of unrecorded income for a number of transition countries. They also modified the simple ECM to allow for changes in electricity prices and changes in the share of the private and industrial sectors as suggested by Eilat and Zinnes (2002) and Lacko (1999). These modifications affected the estimated size and trajectory of unrecorded incomes, and eliminated some, but not all of the negative values of the share of unrecorded activities.

Sosic and Faulend (2002) used the electricity consumption method in order to obtain an estimate of dynamics of undeclared work from sources independent of money aggregate trends to check the consistency of estimates based on monetary methods. In estimating undeclared work with the electricity consumption method they used the assumption on the unitary elasticity of change in the consumption of electricity to changes in the overall GDP also used by Kaufmann and Kaliberda (1996). A decision to base this estimate on overall consumption is motivated by the possibility that some of the electricity produced is actually stolen, which is thus recorded within losses. At the end, they also adhered to the assumption that undeclared work came to 25% of declared work in 1995.

The method by which undeclared work is estimated via electricity consumption has been subject to criticisms in its simplest form. First of all, not all economic activities are equally electricity-intensive, while some service industries that are easier to conceal

or switch into the undeclared work sphere are often labour intensive. Technological advances that increase efficiency reduce the need for electricity, and electricity consumption elasticity compared with changes in GDP can change in some years (Schneider & Ernste, 2000). Finally, the weather can impinge crucially in some years. Nevertheless, observation of trends over a longer period of time should cancel out the effect of inter-year temperature oscillations. Table 4 shows the dynamics of registered real GDP, the consumption of electricity, and an estimate of the dynamics of undeclared work expressed by what percentage it constitutes of declared work, derived according to the consumption of electricity.

Feige and Urban (2003) calculated the share of the unrecorded income in TEA ( $Y^{UR}/Y$ ) for a group of countries, including Croatia, as estimated by the modified electric consumption method (MEC) based on the temporal cross-section estimates. Overall, the trajectory of the estimates labelled [ $Y^{UR}/Y$  MEC] display an inverted U-shaped pattern. It appears that the unrecorded sector's share of TEA grew during the early years of the transition and eventually declined during the second half of the transition decade. However this observed temporal pattern is directly affected by the extent to which the official GDP has been adjusted with imputations for the non-observed sector. The temporal pattern of the non-observed economy imputations as a fraction of estimated TEA is also displayed as the series ( $Y^{UI}/Y$  MEC).

### 3.7. Latent variable methods

Lovrinčević, Marić, and Mikulić (2006) estimated the total amount of undeclared work in Croatia using two approaches. The first one is the sum of particular forms of undeclared work according to the approach by the Eurostat (N1-N7). Due to the implementation of conservative assumptions, the results of the mentioned methods could be taken as a lower estimation threshold of undeclared work. In the second variant, using other methods of estimation (input method, DYMIMIC method) and average deviations of result of other methods and Eurostat method, estimated is the higher boundary (threshold) of undeclared work in Croatia. They calculated lower and higher estimation thresholds of undeclared work. The average share of undeclared work in total Gross Additional Value (GAV) and GDP decreased during the observed period, from 15.4% GAV (12.4% GAV) in 1998 year to 13.9% GAV (11.2% BDP) in 2002. The economic sectors with the highest share of UW in GAV in the year 2002 were: Hotels and restaurants (33.7%), Real estate leases and business services (31.7%), Fishing (26.7%), Building (21.7%), Other community, social and personal services (19.9%) and Trade, repairs of motor vehicles and household goods (19.1%). During the observed period, the share of undeclared work in total GAV increased in the following sectors:

Table 4. Estimates of the dynamics of the UW for Croatia using the electricity consumption method.

	1995	1996	1997	1998	1999	2000
Rate of rise of GDP (Official economy in %)		5.9	6.8	2.5	-0.4	3.8
GDP Index (Official economy)	100.0	105.9	113.1	115.9	115.5	119.9
Rate of rise in electricity consumption (%)		5.7	6.1	4.4	2.4	1.2
Total GDP (declared and undeclared)	125.0	132.2	140.2	146.4	149.9	151.7
Undeclared as percentage of declared work (%)	25.0	24.8	24.0	26.3	29.8	26.5

Source: Sosic and Faulend (2002).

Hotels and restaurants, Fishing, Building, Manufacturing and energy, Gas and water supply. The total amount of undeclared work in Croatia in 2002 was HRK 20.1 billion, which is increase of 18% in comparison to 1998. The most important form is incorrect reporting HRK 9.0 billion, followed by non-registered (hidden) producers (HRK 5.6 billion) and statistically unavailable data (HRK 2.7 billion). The most significant increase was observed in incorrect reporting, while there was a decrease in the realised amount by non-registered (hidden) producers (Lovrinčević, Marić et al., 2006). That means that undeclared work is *moving* to the field of incorrect reporting, mostly tax evasion.

In calculation of a higher estimation threshold of undeclared work, Lovrinčević, Marić et al. (2006) used the average share of undeclared work (12.1% GDP) according to Eurostat estimations for EU new member states. The result of all others methods (input electric consumption, DYMIMIC) was 2.15 times bigger than the results of the Eurostat approach. If the estimation of the grey economy (undeclared work) for Croatia according to the Eurostat estimation (15.6% GDP) is multiplied with the average share for other countries (2.15 times bigger), a higher estimation threshold of undeclared work in Croatia is obtained (33.6% GDP) for the year 2002.

### 3.8. Tax evasion

One form of unofficial economy is tax evasion. Sanja Madžarevic-Šujster (1997) considered the forms and extent of the evasion of payment of taxes and contributions. This writer explained that in Croatia this most often involves declaring lower tax bases, the payment of wages via banks, unions or in kind, hence evading the payment of taxes and surtax. The amount of unpaid tax and contributions is very much conditioned by the source of the income made, that is, by the industrial sector in which the person is employed. Assuming that the non-payment of taxes and contributions is less common in large firms (because of the extent of operations, the need to run complete accounts and non-cash payments, and the fact that they were until recently either publicly owned or in mixed ownership), and that the earnings of self-employed persons and entrepreneurs are larger than those of ordinary employees, the author carried out two simulations.

In the first simulation, the amounts of the wages in small and medium-sized firms were equated with the wages paid out in large firms. According to this simulation, tax evasion and contributions evasion came to 3.7% of GDP in 1994, 4.34% in 1995, and 4.65% in 1996. In the second simulation it is assumed that for the sake of some kind of social protection the real measure of employment in Croatia is the figures about active insured persons at the disposal of the then Retirement and Disability Insurance Fund, that the monthly receipts of active insured persons were equivalent to the average receipts in the economy (lower than receipts in the big companies). Thus, as the difference between actually paid and potential contributions and income tax, evasion of contributions and income tax as a percentage of GDP was 2.76% in 1994, 3.71% in 1995 and 3.81% in 1996. Madzarevic-Sujster (2002), according to certain assumptions, carried out similar simulations for the period from 1994 to 2000 (Figure 1). Using the first simulation, she estimates that the amount of evasion of income tax and surtax grew from 1.5% of GDP in 1994 to 2.7% in 2000, while according to the second simulation (after an adjustment for the writing off of contributions and the evasion of contributions) evasion of tax and contribution as a percentage of GDP rose from 4.3% to 5.9%. The first simulation gives a lower limit for the evasion of direct taxes and contributions, and the second simulation gives a lower limit of the estimate. Thus, a large chunk of income goes unreported and untaxed. An obvious consequence of tax evasion is the erosion of

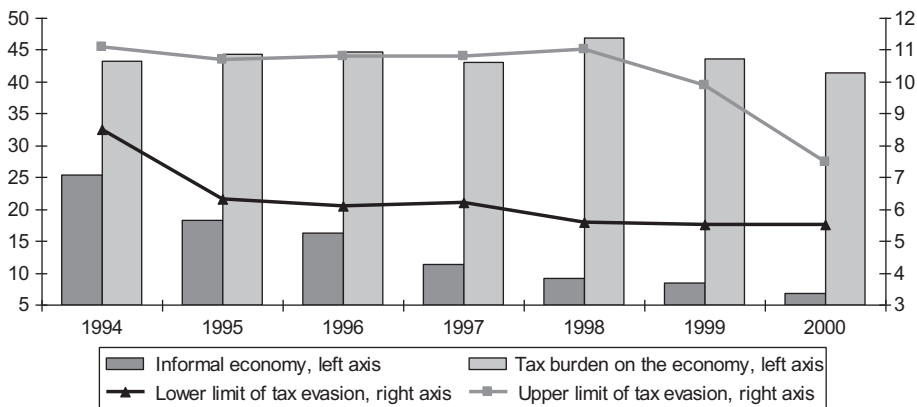


Figure 1. Tax evasion, tax burden and the share of the informal economy (% of GDP).  
Source: Madžarevic-Šujster (2002).

the tax base. Tax evasion also affects the government's ability to distribute the tax burden fairly: people who underreport their income may be unfairly receiving benefits that the government has intended to provide only to those who earn below a certain amount.

### 3.9. Methodology for estimate of non-exhaustiveness of national accounts

The classification of non-exhaustiveness types in national accounts is based on various characteristics of the producer, i.e. the way in which data is obtained from producers. The classification of non-exhaustiveness types in national accounts is previously presented in Table 1. Regardless of the mutual exclusivity of individual forms, in practice there can also be cases in which individual types of non-exhaustiveness in the national accounts overlap. For example, there can be some overlapping between types N1 and N2, as well as between types N1 and N6. The analysis of individual non-exhaustiveness types aims at insuring a completely exhaustive non-overlapping reporting, which leads towards the ultimate goal of accuracy and exhaustiveness of GDP figures. The analysis of non-exhaustiveness types is not a final aim, and neither is the allocation of individual sources of the underground economy of crucial importance. The importance lies with countries following a consistent set of procedures in order for the obtained data to be directly comparable.

Lovrinčević et al. (2011) calculated that the total non-exhaustiveness adjustments in Croatia in 2000 amounted to HRK 16.6 billion (EUR 2.21 billion) with the inclusion of illegal activities, or 15.1 billion HRK (EUR 2 billion) where illegal activities are not included. In the last estimated year (2008) the total unofficial economy amounted to 23.3 billion HRK or 20.4 billion HRK without illegal activities (EUR 3.2 and 2.7 billion, respectively). Apart from 2003, absolute values of the unofficial economy estimates increased throughout the observed period. On the other hand, the share of the unofficial economy was continuously decreasing from 8.46% in 2000 to 5.90% of GDP in 2008.

#### 4. The unofficial economy and economic crisis

The period from 2000 to 2008 can be characterised as a successful one for the Croatian economy. The development gap in comparison to the EU has narrowed and the overall macroeconomic environment could be defined as relatively stable. The Croatian economy in the prerecession period recorded an average economic growth of above 4%, low inflation, decreasing unemployment rate and decreasing public deficit. On the other hand, the lack of overall competitiveness resulted in a rising current account deficit and foreign debt. While GDP growth in 2008 was significantly lower than 2007, but still positive, in 2009 GDP growth fell to -5.8%. The sharpest annual contraction was recorded in the first quarter of the year, with a slow down towards the end of the year. This was primarily the result of a slight positive growth recorded in the last three quarters of 2008. The fall of GDP, as shown in Figure 1 continued also in 2010, but was milder (1.8%) (Bejaković & Gotovac, 2011).

The overall unemployment rate for the population aged 15–64 fell from 13.1% in 2005 to 8.6% in 2008. In 2009 and 2010 the unemployment rate increased to 9.3% and to 12% respectively. Compared to men, whose average unemployment rate remained below 10%, women experience rates of unemployment in the range of 12%. However, since the economic sectors that suffered most during the crisis are male-dominated, the percentage increase in the unemployment rate for men in the period 2008–2010 equalled 4.4 percentage points (from 7.1% to 11.5%), while for women it increased by 2.3 percentage points (from 10.4% to 12.7%).

The recession, acting through the demand channel had a direct negative impact not only on the official but also on the unofficial economy. On the other hand, the increases in the unofficial economy can be explained by other determinants. There are various factors determining the relative significance of the unofficial economy and relation to the official economy. Theoretical causes of the shadow economy are as follows (Feld & Schneider, 2010; Frey & Pommerehne, 1984; Schneider & Ernste, 2000):

- (a) Burdens on the official economy;
- (b) Public sector services;
- (c) Tax morality and government controls;
- (d) Labour market conditions;
- (e) Structural factors.

All of above factors have an impact on the relation between the formal and informal economy. If the tax burden is rising, we can expect a rising share of the unofficial economy. The higher the difference between the total cost of labour in the official economy and after-tax earnings from work, the greater is the incentive to work in the unofficial economy. Additionally, taxes affect labour-leisure choices and increase labour supply in the unofficial economy. Empirical evidence on the influence of the tax burden on the shadow economy is provided by Schneider (1994, 2005), Johnson et al. (1998), Feld (2010). An increase of the unofficial economy can lead to reduced public revenues from taxes which in turn reduce the quality and quantity of publicly provided goods and services. Ultimately, this can lead to an increase in the tax rates for firms and individuals in the official sector, quite often combined with deterioration in the quality of public goods and of the administration, leading to an even stronger incentive to participate in the shadow economy.



In the estimation of the size of the non-official economy (NOE) in Croatia, Klarić (2011) included, among other possible causes and indicators of the NOE, primarily the tax burden. It is probably the most frequently used explanatory variable when discussing the NOE. Certain methods treat taxes as the sole or, at least, the prime reason for entering into the realms of the non-observed economy. Taxes affect the cost of living, as well as costs of doing business, and they are incorporated into every price in the official economy. Tax evasion therefore might seem tempting as a way of increasing one's wealth. On the other hand, penalties are put in place for those trying to evade taxes. Those obligated to pay taxes have to weigh the gains of evasion against the risks of being caught. It is therefore reasonable to assume that the greater the tax burden, the greater the willingness to evade it and underground and informal production, for instance unregistered employment, are more likely to occur. There is an additional reason why it might be especially interesting to observe the influence taxes have on NOE. While most economic variables can only be influenced through a set of measures, the results of which can be uncertain, the level of taxes can be directly dictated by the government.

A lower tax morality leads to an increased readiness to become active in the hidden economy. A growing intensity of public controls and a rise in expected punishment *ceteris paribus* reduces the return on hidden activities and therefore has the opposite effect according to Frey and Pommerehne (1984). Johnson et al. (1997) predict that *ceteris paribus* countries with higher general regulation of their economies tend to have a higher share of the unofficial economy in total GDP. The quality of public institutions is another key factor of the development of the informal sector. The underground economy is also very often closely linked to corruption (Lovrinčević, Mikulić, & Budak, 2006).

If labour market conditions are improving in terms of higher labour demand in official sectors, individuals have a stronger negotiation position and ask to be included in social security schemes. If labour demand is weak, individuals are more concentrated on short-term perspective (current income) and neglect loss of potential social benefits in the future. Additionally, the longer official working time, the higher are the opportunity costs of taking up additional work in the hidden economy. Unemployment benefits also influence readiness of workers to participate in official economy. The determinants listed so far do not apply to all sectors in the same way. Rather, there are certain industries (particularly those with low capital intensity) in which a higher probability of working in the hidden economy can be assumed. If a shift in demand increases a relative share of those industries, an overall increase in the share of the unofficial economy is expected. Table 5 presents influence on the unofficial economy and relative importance of various determinants. Empirical researchers in most cases find the tax burden as the most important determinant of the unofficial economy, followed by tax morale and quality of state institutions (Lovrinčević et al., 2011).

It is evident that the trend of a decreasing share of the underground economy in GDP stopped in 2008 and reversed in 2009. This finding supports the conclusion that the official and the underground economy in Croatia are substitutes, working in opposite directions. It is evident that when the underground economy is reduced by 1%, the official GDP figure will be artificially increased by 0.48% and vice versa. It means that the official GDP growth figures used to be overestimated by an average 0.3% in the period 2001–2008, and underestimated by 0.7 in the period 2009–2010, when the underground economy increased as a result of the recession. The most important factors influencing the underground economy in Croatia (tax moral, tax burden and labour market conditions) worked in the same direction, increasing the share of underground economy in

Table 5. Factors which influence on the shadow economy according to results of various empirical studies.

Factors influencing the shadow economy	Influence on the shadow economy (in %)	
	a	b
Increase of the tax burden	35–38	45–52
Quality of state institutions	10–12	12–17
Transfers	5–7	7–9
Specific labour market regulation	7–9	7–9
Public sector services	5–7	7–9
Tax morale	22–25	

Notes: (a) Average values of 12 studies.

(b) Average values of empirical results of 22 studies.

Source: Feld and Schneider (2010).

period 2008–2010, while they were stable during 2002–2008 period. Furthermore, it seems that the elasticity of the underground economy in relation to the economic activity is higher during recessions (period 2009–2010) in comparison to periods of growth (Lovrinčević et al., 2011).

## 5. Conclusion

Individual studies of the unofficial economy in Croatia describe in detail the problems of particular forms in which undeclared work appears and measures needed for their prevention. Some of them will be mentioned here:

1. Economic policy measures seeking to reduce undeclared work should place primary interest on the institutional sphere. In order to better understand the unofficial economy in Croatia, it is essential to understand the relation of the state towards the economy and toward society as a whole. The border line between the official and the unofficial economy (or declared and undeclared work) in Croatia is not a problem only because the activities of the official and unofficial economy are closely connected and because the very development of privatisation and market transformation influences the demand for (de)regulation, but also, because on top of all this, the state itself shows a tendency to operate in the grey zone (of politics, laws and the economy).
2. Official statistical data significantly overestimate economic activity during periods of growth, while underestimating activity during recessions, making macroeconomic data more volatile and pro-cyclical than they really are. Such volatility usually gives rise to the overestimations and biased fiscal projections in good times and vice versa. Additional contribution to fiscal biasness is the constantly diminishing share of underground economy in retail trade which give rise to the overestimation of fiscal revenues in value added tax based systems.
3. The state must see that the following goals are realised: (a) high professional level of state services; (b) complete independence and better organisation and equipping of the judicial system and the exclusive accountability to Parliament of highly professional control and inspection services (independent of the government); (c) transparency of rules and regulations and of all procedures where the

possibility of rent seeking is a stimulation to the unofficial economy; (d) possibility of truly democratic and public control by citizens and their representatives over all state institutions; (e) rational state expenses in spending public revenue, but also reduction of over extensive public expenditure (the share of public expenditure in the GDP); (f) high quality service from the public sector; (g) decisive break with paternalistic capitalism; (h) equal conditions for small firms and companies in the capital market so they do not have to look for capital in the grey market.

4. When it comes to reducing undeclared work in a particular area, such as foreign trade, the following elements are essential: improvement in the customs services and implementation of techniques for improving trade statistics, cost analysis and, consequently, analysis of the price of goods and services, followed by prevention of false invoicing, etc. It is also essential to undertake the necessary changes in the legal system (eliminate some of the more important shortcomings in laws and introduce stricter sanctions for illegal economic activities in international exchange), to improve official statistics and the efficiency and co-operation between various state bodies.
5. As the recommendations for economic policy, it could be added that research on tax evasion indicates that the unofficial economy could be reduced by the introduction of value added tax (return of prepaid tax introduces better compliance). When making decisions about measures, it is more important to prevent the causes of the unofficial economy than its negative consequences (penalties, introduction of new taxes, etc.) From the liberal point of view, the unofficial economy will decrease if economic growth, stabilisation, privatisation and restructuring are realised and if the role of the state in the economy is reduced, if taxes are lowered and if the rights the unemployed enjoy are diminished.

### Disclosure statement

No potential conflict of interest was reported by the author.

### Funding

This work was supported by the European Commission's Framework 7 Industry-Academia Partnerships Programme (IAPP) [grant no. 611259] entitled 'Out of the shadows: developing capacities and capabilities for tackling undeclared work in Bulgaria, Croatia and FYR Macedonia' (GREY). The author would like to thank the funders for providing the financial support to enable the research and writing of this paper. The usual disclaimers apply.

### Note

1. Like shoe cleaning, baby-sitting, offering various services like transcription, teaching languages or school subjects, selling their own or other peoples' products in markets or working as travelling salesmen.

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